Topic: Power rule for negative powers or powers in the denominator

Question: Differentiate the function.

$$f(x) = x^{-2}$$

Answer choices:

A $-3x^{-2}$

B $-2x^{-3}$

C $-2x^{-2}$

D $-2x^{-1}$

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Solution: B

To use power rule

$$\frac{d}{dx}x^n = nx^{n-1}$$

on a function with a negative power, when the term is in the numerator, just apply power rule like normal.

$$f(x) = x^{-2}$$

$$f(x) = -2x^{-2-1}$$

$$f'(x) = -2x^{-3}$$

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Topic: Power rule for negative powers or powers in the denominator

Question: Differentiate the function.

$$f(x) = 3x^{-5} - 4$$

Answer choices:

A $-12x^{-6}$

B $-15x^{-4}$

C $-5x^{-6}$

D $-15x^{-6}$

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Solution: D

To use power rule

$$\frac{d}{dx}x^n = nx^{n-1}$$

on a function with a negative power, when the term is in the numerator, just apply power rule like normal.

$$f(x) = 3x^{-5} - 4$$

$$f'(x) = 3(-5)x^{-5-1} - 0$$

$$f'(x) = -15x^{-6}$$

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Topic: Power rule for negative powers or powers in the denominator

Question: Differentiate the function.

$$f(x) = \frac{4}{x^2} - \frac{6}{x} + 2$$

Answer choices:

A $-8x^{-3} + 6x^{-2}$

B $-8x^{-4} + 6x^{-3}$

C $-2x^{-3} + x^{-2}$

D $-8x^{-2} + 6x^{-1}$

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Solution: A

To use power rule

$$\frac{d}{dx}x^n = nx^{n-1}$$

on a function with a power, when the term is in the denominator, move it to the numerator first.

$$f(x) = \frac{4}{x^2} - \frac{6}{x} + 2$$

$$f(x) = 4x^{-2} - 6x^{-1} + 2$$

Then apply power rule like normal.

$$f'(x) = 4(-2)x^{-2-1} - 6(-1)x^{-1-1} + 0$$

$$f'(x) = -8x^{-3} + 6x^{-2}$$

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